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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/506,717	09/07/2004	Takeo Yamaguchi	NAII123495	4853
26389 7590 11/07/2008 CHRISTENSEN, O'CONNOR, JOHNSON, KINDNESS, PLLC 1420 FIFTH AVENUE SUITE 2800 SEATTLE, WA 98101-2347				
EXAMINER CHU, HELEN OK				
ART UNIT		PAPER NUMBER		
1795				
MAIL DATE		DELIVERY MODE		
11/07/2008		PAPER		

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

# Office Action Summary

**Application No.**

10/506,717

**Applicant(s)**

YAMAGUCHI ET AL.

**Examiner**

Helen O. Chu

**Art Unit**

1795

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 31 July 2008.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-4 and 7-29 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-4, 7-29 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/CDC)
- 4) ☐ Interview Summary (PTO-413)
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_
- Paper No(s)/Mail Date \_\_\_\_\_

#### **DETAILED ACTION**

1. Applicant's amendment has been received on 7/31/2008. Claims 1-4, 9, 14, 17, 24 have been amended. Claim 5 have been cancelled. Claim 29 is new.

#### ***Information Disclosure Statement***

2. The information disclosure statement (IDS) submitted on 7/31/2008 was filed. The submission is in compliance with the provisions of 37 CFR 1.97. Accordingly, the information disclosure statement is being considered by the examiner.

#### ***Claim Analysis***

3. It is noted that claims 1 , 14, 17, 24 have "intended use" language such as "and a thermal shrinkage ratio of +- 1% or less in case of the thermal treatment at 105 degrees Celsius for 8 hours" and it has been held that a recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus satisfying the claimed structural limitations. Ex parte Masham, 2 USPQ2d 1647 (1987). The recitation states that the thermal treatment is optional and only when the thermal treatment proceeds, the shrinkage ratio is relevant. Therefore, the recitation is considered an intended use language.

#### ***Claim Rejections - 35 USC § 102/103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

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(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 1, 4, 7-14, 18, 21, 22, 24, 26-28 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Takeo et al. (EP 1 202 365).

In regards to claims 1, 4, 7-9, 11-13, the Takeo et al. reference a process of making and a product of a direct methanol solid polymer fuel cell which comprises a porous (Figure 1 and 2) polyimide (Paragraph 17) electrolyte with two or more proton conductive monomers can be used to produce a co-polymer (Paragraph 23-25). The Takeo et al. discloses the porous substrate is swell resistant (Abstract) that is normalized 1.2 or less and 0.2 or more (Paragraph 26). Porous substrate undergoes pervaporation at 25 C. The Takeo et al. discloses a porous substrate with an average pore diameter to be 0.001 to 100.mu.m, the porosity to be between 10-95% and a thickness of 100.mu.m (Paragraph 4). The Takeo et al. reference also discloses a heat resistance at a temperature of higher than 130 degrees Celsius (P61) but does not discloses a heat resistance of a temperature of higher than 200 degrees Celsius, however, for the range higher than 130 degrees but less than or equal to 200 degrees Celsius, it is the Examiner's position that the amounts in question are so close that it is a prima facie obvious that one skilled in the art would have expected them to have the

same properties *Titanium Metals Corp. v. Banner*, 227 USPQ 773. The range over 130 degrees Celsius which encompasses over 200 degree is anticipated.

In regards to claim 14, 18, 21, 22, the Takeo et al. reference discloses a polyimide membrane where the pores are filled with proton conductive polymer where there is a step of heating and filling the pores (Paragraph 32). The membrane resists swelling (Abstract) and therefore, cannot be swollen with methanol or water.

In regards to claim 10, the proton conductivity of the electrolyte membrane 0.001S/cm and not higher than 10.0 S/cm at 25 C and 100% humidity is an inherent trait of the invention by Takeo et al, since the invention by Takeo et al. and the Applicants invention is the same. Further it is known in the art that proton conductivity of Nafion is approximately  $7.8 \times 10^{-2}$  S/cm. The Takeo et al. discloses that the proton conductivity of the invention is improved over Nafion (Paragraph 61) , therefore, it would be obvious that the proton conductivity of the invention by Takeo et al. is in the range of 0.001 S/cm and 10.0 S/cm. Please not that Paragraph 58 tested the invention in a mixture of water and methanol under its equilibrium vapor pressure or supersaturated state. Under the equilibrium vapor pressure incorporates 100% humidity.

In regards to claim 24, 26, 27, the Takeo et al. reference discloses a fuel cell having a proton conductivity of between 0.001 S/cm to 10.0 S/cm at 25 degree Celsius in 100% humidity that is swelling resistant. Since the electrolyte membrane as disclosed by Takeo et al. is the same as invention of the Applicants, the intrinsic property of  $0.01\text{m}^2\text{h/kg.mu.m}$  to  $10.0\text{m}^2\text{h/kg.mu.m}$  must also be the same.

It is noted that claims 28 are product-by-process claims. "Even though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process." In re Thorpe, 777 F. 2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985). Since the electrolyte membrane is similar to that of the Applicant's invention, Applicant's process is not given patentable weight in this claim.

### ***Claim Rejections - 35 USC § 103***

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 2, 3, 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Takeo et al. (EP 1 202 365).

In regards to claims 2 and 3, the Takeo et al reference discloses the claimed invention above and further comprises polyimide or polyamide (Paragraph 23) used in the electrolyte but does not specify an aromatic polyimide or polyamide. However, because homologs, analogs, and isomers in chemistry may create a prima facie case of

obviousness. *In re Dillion* 16 USPQ 2d 1897, 1904 (*Fed. Cir.*, 1990); *In re Payne* 203 USPQ 245 (CCPA 1979); *In re Mills* 126 USPQ 513 (CCPA 1960); *In re Henze* 85 USPQ 261 (CCPA 1950); *In re Hass* 60 USPQ 544 (CCPA 1944).

In regards to claim 15, the Takeo et al. reference discloses a step of heating the monomer to polymerize the monomer however, the Takeo et al. does not disclose repeating the same step again. In general the transposition of process steps or the splitting of one step into two, where the processes are substantially identical or equivalent in terms of function was held to be not patentably distinguish the processes. *Ex parte Rubin* 128 USPQ 159 (PO BDPatApp 1959).

8. Claims 16, 17, 19 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Takeo et al. (EP 1 202 365) in view of Yamaguchi et al. (JP 05-031343)

In regards to claims 16, 17, 19 and 20, the Takeo et al. reference discloses the claimed invention above and further comprises a step of plasma grafted polymerization that requires filling and heating the membrane but does not disclose the use of surfactants in the monomer solution, however, the Takeo et al. admitted that filling the pores of a membrane through plasma grafted polymerization is known to one of ordinary skill and can be found in the Yamagushi et al. reference. The Yamagushi et al. reference discloses plasma grafted (radical initiated which produces cross-linked polymers; Abstract) with the use of surfactants in the monomer solution.

9. Claims 20 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Takeo et al. (EP 1 202 365) in view of Brunner et al. (US Patent 3,423,366)

In regard to claims 20 and 23, the Takeo et al. reference discloses a method for producing an electrolyte membrane as in claim 14 and further incorporated herein. However, the Takeo et al. does not disclose a polyimide that contains 3,3', 4, 4-biphenyltetracarboxylic acid dianhydride and an oxydianiline. However, the Brunner et al. reference discloses a cross linked nitrogenous polyesters of polyimide (Column 1, Lines 20-25) which comprises 3,3', 4,4-biphenyltetracarboxylic acid or a dianhydride (Column 4, Lines 59-62) and an oxydianiline (Column 5, Lines 25-30) The Brunner et al. reference also states that the polyimide composition is useful in impregnating or as an adhesive agent. Therefore, it would have been obvious to one of ordinary skill at the time the invention was made in incorporate the polyimide composition as disclosed by Brunner et al. into the polyimide porous structure to enhance impregnation for the porous membrane.

10. Claims 25 and 29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Takeo et al. (EP 1 202 365) in view of Brunner et al. (US Patent 3,423,366)

In regards to claim 25, 29, the Takeo et al. reference discloses an electrolyte membrane as in claim 24 and further incorporated herein. However, the Takeo et al. does not disclose a polyimide that contains 3,3', 4, 4-biphenyltetracarboxylic acid dianhydride and an oxydianiline. However, the Brunner et al. reference discloses a cross linked nitrogenous polyesters of polyimide (Column 1, Lines 20-25) which comprises 3,3',4,4-biphenyltetracarboxylic acid or a dianhydride (Column 4, Lines 59-62) and an oxydianiline (Column 5, Lines 25-30) The Brunner et al. reference also states that the polyimide composition is useful in impregnating or as an adhesive agent.



Therefore, it would have been obvious to one of ordinary skill at the time the invention was made in incorporate the polyimide composition as disclosed by Brunner et al. into the polyimide porous structure to enhance impregnation for the porous membrane.

***Response to Arguments***

11. Applicant's arguments filed 7/31/2008 have been fully considered but they are not persuasive.

A) The Applicants argue, "Applicants note that Claim 28 has not been rejected in the outstanding Examiner's Action and therefore is presumably allowed. If for some reason the Examiner has not examined Claim 28 in preparing the outstanding Examiner's Action, and finds it necessary to issue a rejection of Claim 28 in the next Examiner's Action, such rejection should not be made final in order to allow applicants an opportunity to address any rejection of Claim 28 substantively without necessitating the filing of an RCE" However, claim 28 was rejected as product by process under 35 U.S.C 102/103 in which the product has a final product of polyimide as it is claimed and does not differentiate the final product of a polyimide from the prior art. A typo had appeared on the non-final office action dated 3/4/2008 for a product by process rejection on claim 8 which was intended to state 28, claim 8 was already rejected under item 2 under 35 U.S.C 102(b) and therefore could not have been rejected under 35 U.S.C 102/103 also. The appropriate corrections has been made and further clarified. Furthermore, the Applicants had amended claim 1, 14, 17, 24 in which necessitated a new grounds of rejection for all of the dependent claims.

B) The Applicants argue, the Takeo reference fails to disclose every element of the invention of Claims 1 and 14 as amended. As noted above, amended Claims 1 and 14 both require that the porous substrate of the claimed electrolyte membrane have a heat resistant temperature of 200°C or higher and a thermal shrinkage ratio of 4-1% or less in case of thermal treatment at 105°C for 8 hours. The Takeo reference is directed to an electrolytic membrane for a fuel cell. In paragraph 1160, Takeo states that the membrane kept its ability to highly inhibit methanol permeation up to about 180°C. Nowhere does Takeo disclose an electrolyte membrane that has a heat resistant temperature of over 200°C. In addition, nowhere does Takeo disclose an electrolyte membrane having a thermal shrinkage ratio of 1% or less in the case of thermal treatment at 105°C for 8 hours. However, the Takeo reference does state that the heat resistance is over 130 degrees Celsius (P61) which incorporates ranges of over 200 degrees Celsius. The recitation "a thermal shrinkage ratio of 4-1% or less in case of thermal treatment at 105°C for 8 hours," particularly the recitation "in case of" discloses a thermal treatment that appears to be optional.

Furthermore, all of the arguments in regards to the dependent claims and independent claims appear to address this particular recitation and therefore as it was explained the arguments are not persuasive.

### ***Conclusion***

12. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP

§ 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Helen O. Chu whose telephone number is (571) 272-5162. The examiner can normally be reached on Monday-Friday 8am-4:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Ryan can be reached on (571) 272-1292. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

HOC

/PATRICK RYAN/

Supervisory Patent Examiner, Art Unit 1795